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Electronic Submission

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Portals II, Room TW-A325
Washington, DC 20554

Ex Parte Submission

RE: Petition for Rulemaking Filed by AT&T to Make 800 Cellular Base Station Power Rules Consistent with Rules for Other Mobile Broadband Services, WT Docket No. 12-40

Dear Ms. Dortch:

AT&T files this letter in the docket to further explain assumptions underlying the power spectral density ("PSD") study attached to AT&T's Petition for Rulemaking, propose a power flux density ("PFD") limit that is representative of the real-world PFD in AT&T's current network, and propose a new methodology for calculating the service area boundary ("SAB") from base stations operating at PSD power levels.

PSD Study Assumptions. In support of its Petition for Rulemaking in this docket, AT&T attached a study dated February 12, 2012, entitled, *A Further Comparison of the Impacts on Public Safety Receivers from the Various Wireless Technologies used in AT&T's Migration from Narrowband GSM to Broadband LTE in the 850 MHz CMRS Cellular Band*. On May 15, 2015, AT&T filed back-up information in this docket supporting that study. AT&T now provides the following assumptions underlying development of that study:

- For each Table included in the study, Case 1 assumes a tri-sector base station operating with 5 GSM carriers per sector, a typical GSM deployment per cellular block on AT&T's cellular network.

- Each non-rural area Table assumes an average antenna height of 30 meters. Due to the greater variety of antenna heights in rural areas in AT&T's cellular network, separate rural area Tables are presented, one that assumes a representative lower end antenna height of 47 meters and another that assumes a representative high end antenna height of 92 meters.

- Each Table in the study assumes the following technologies and base station power settings per transmitter:[1]
  - GSM—500 Watts
  - UMTS—500 Watts
  - 5 MHz LTE—500 Watts x 2 transmitters for MIMO
  - 10 MHz LTE—1000 Watts x 2 transmitters for MIMO

- For each Table, AT&T assumed antenna gains, discrimination, and transmission line losses based on typical AT&T 850 MHz deployments and the geometry of the interference paths. The actual gains and discrimination used were included in the PSD back-up documentation filed in this docket by AT&T on May 15, 2015.

- The actual sideband emissions from AT&T's transmitters were gathered from data submitted to the Commission by the transmitter vendor during the Commission's transmitter certification process. The maximum allowable level of sideband (OOBE) interference was assumed to be the industry standard 1 db rise in the noise floor specified in TIA bulletin, TSB-10-F, "Interference Criteria for Microwave Systems."

- The public safety receiver overload level was based on information provided by Motorola's public safety equipment division.

- Each Table evaluated public safety receiver performance from a base station using the following industry-accepted propagation model distances and formulas:
  - 40 meters or less represents line-of-sight interference. This distance would typically lie inside or just outside of a fence enclosing the site, with no clutter. As in all line-of-sight environments, the Friis equation is used with a propagation constant of 2.
  - 200 meters represents near line-of-sight with some clutter (trees, buildings, etc.). The Friis equation is used with a propagation constant of 2.4 to reflect close proximity to the transmit site, but with added clutter.
  - >1000 meters (1 km) represents non line-of-sight, where clutter predominates the interference path. The COST 231 Hata formula is used.

PFD Measure. Multiple commenters in this docket propose that the Commission add a PFD limit to the Cellular rules if it adopts a PSD option for setting base station power levels. If the Commission chooses to adopt a PFD for the Cellular service, AT&T proposes a limit of 345 $\mu W/m^2/MHz$, which is the maximum PFD in 95% of the area of a typical AT&T Cellular base station. AT&T derived this PFD limit through an iterative process of calculating the distances within 1 km of a typical cellular base station operating at 2500 watts per sector where the PFD exceeds different levels until reaching the 95% target. See Figures 1 and 2 attached hereto. This iterative process involved the following steps:

[1] As AT&T has previously explained, its proposed PSD power limit would be set per sector.

- Plot a PFD curve within an area comprising a 1 km radius of a typical Cellular base station operating at 250 W/MHz or 2500 watts total ERP per sector. This curve is plotted on Figure 2 below.

- Select a PFD to test against the 95% rule—Is the test PFD greater than or less than the PFD within 95% of the area around the Cellular base station? AT&T selected a test PFD of 300 $\mu W/m^2/MHz$ and plotted a line representing that test PFD along the horizontal axis on Figure 2.

- In Figure 2, the horizontal line representing the test PFD of 300 $\mu W/m^2/MHz$ crosses the PSD curve at 7 meters (Point 1) and 245 meters (Point 2), demonstrating that the PFD of a typical AT&T Cellular base station operating at 2500 W ERP per sector exceeds 300 $\mu W/m^2/MHz$ beginning at a 7 meter radius around the base station and ending at a 245 meter radius around the base station. This is also plotted on Figure 1.

- If the geographic area from a 7 meter radius around the base station to a 245 meter radius around the base station represents 5% or less of the area within a 1 km radius around the base station, then this test PFD of 300 $\mu W/m^2/MHz$ is the maximum PFD within 1 km of a typical AT&T Cellular base station operating at 2500 W ERP per sector. If this geographic area represents more than 5% of the area within a 1 km radius around the base station, then a higher PFD would be warranted.

- AT&T calculated that the PFD at a typical Cellular base station exceeded the test PFD of 300 $\mu W/m^2/MHz$ geographic area within about 6% of the 1 km radius around the base station, meaning the PFD was below 300 $\mu W/m^2/MHz$ within about 94% of that 1 km area. To find the maximum PFD in 95% of a 1 km radius around a typical AT&T Cellular base station, AT&T repeated the above calculations for different PSD levels until reaching the PSD of 345 $\mu W/m^2/MHz$.

SAB Calculation. In lieu of the current formula for calculating the SAB in Commission rule Section 22.911(a), AT&T proposes a new methodology for Cellular licensees to calculate SABs for base stations setting power using PSD. AT&T proposes an SAB that continues to be based upon a 32dBu V/m contour (which equates to -104 dBm) and is depicted using an industry standard calibrated predictive propagation model. The maps in Figures 3 and 4 below show the potential SAB at base stations operating at 2500 W per sector for a 5 MHz LTE deployment in Missouri and 10 MHz LTE deployment in Florida. In those maps, the blue line represents the existing SAB, the red line represents the potential SAB for a base station using PSD under the current SAB formula, and the green line represents the potential SAB for a base station using PSD under AT&T's industry standard calibrated predictive propagation model.

In accordance with section 1.1206(b)(2) of the Commission's rules, this letter is being filed electronically with your office. Please feel free to contact me if you have any questions.

Sincerely,

/s/ Linda S. Vandeloop

cc: Roger Noel
Lloyd Coward
Tom Derenge
Keith Harper
Moslem Sawez
Lloyd Coward
Nina Shafran

Figure 1

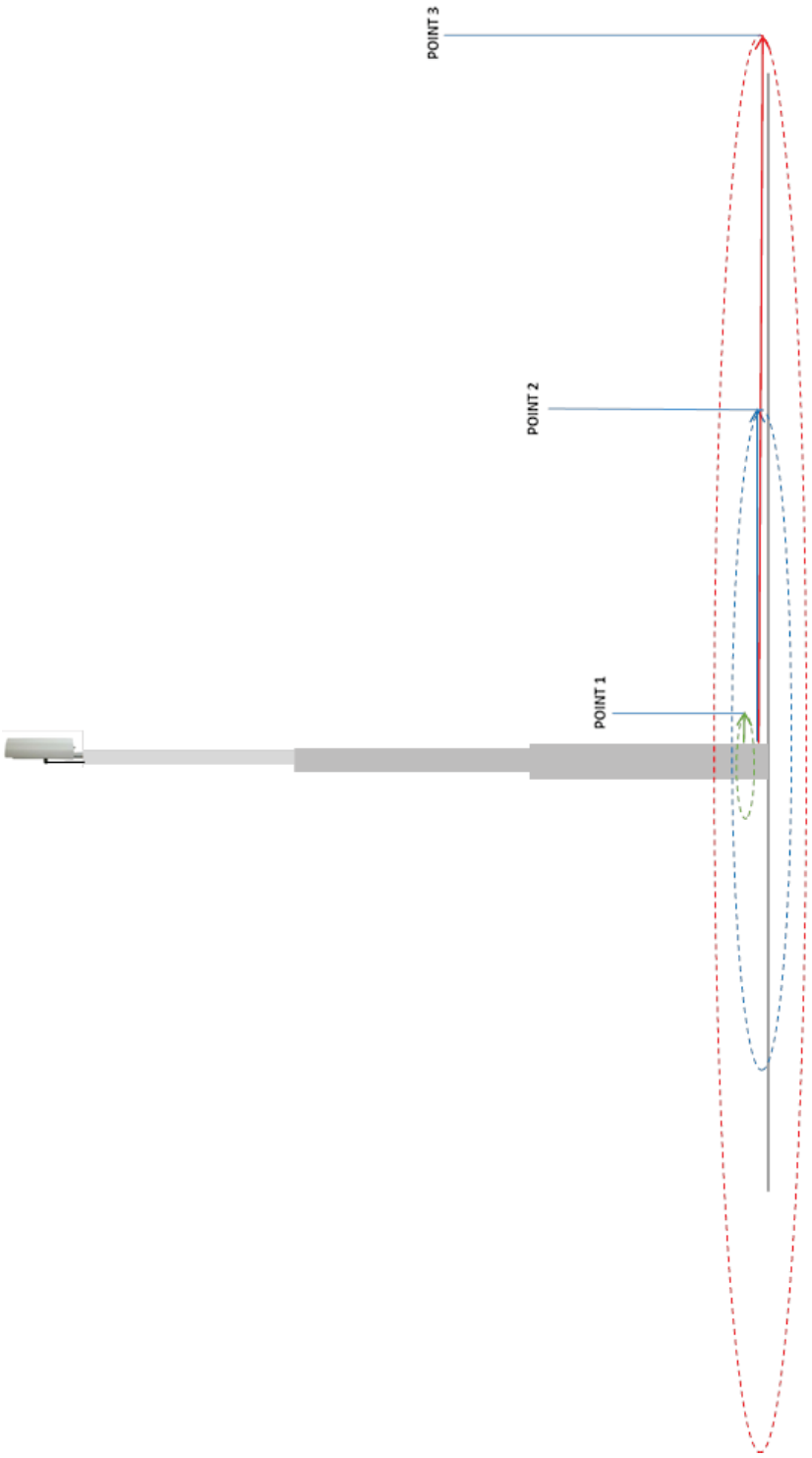

Figure 2

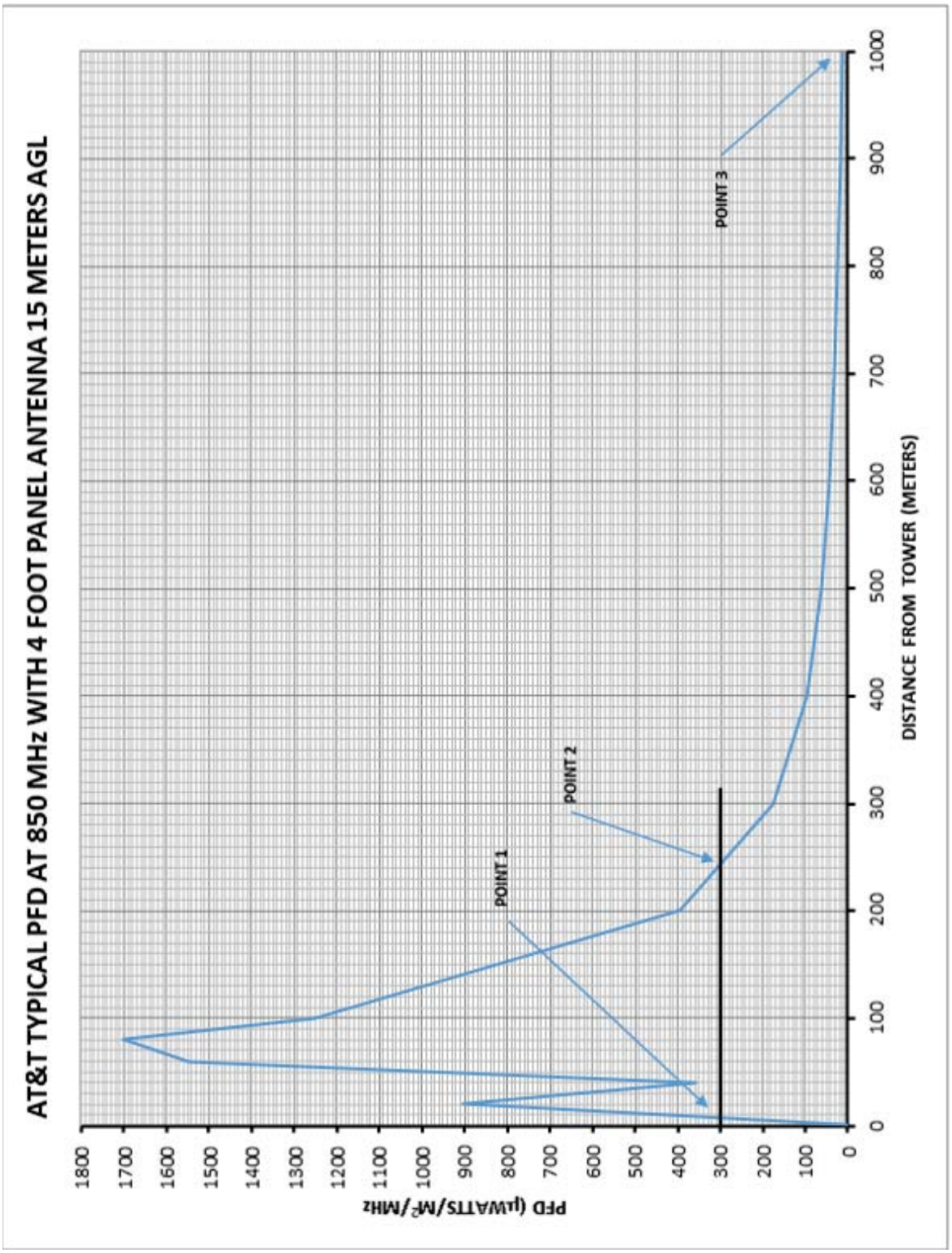
AT&T TYPICAL PFD AT 850 MHz WITH 4 FOOT PANEL ANTENNA 15 METERS AGL
PFD (μWATTS/M²/MHz)
DISTANCE FROM TOWER (METERS)
POINT 1
POINT 2
POINT 3
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
900
1000

Figure 3

LTE 5 MHz Example

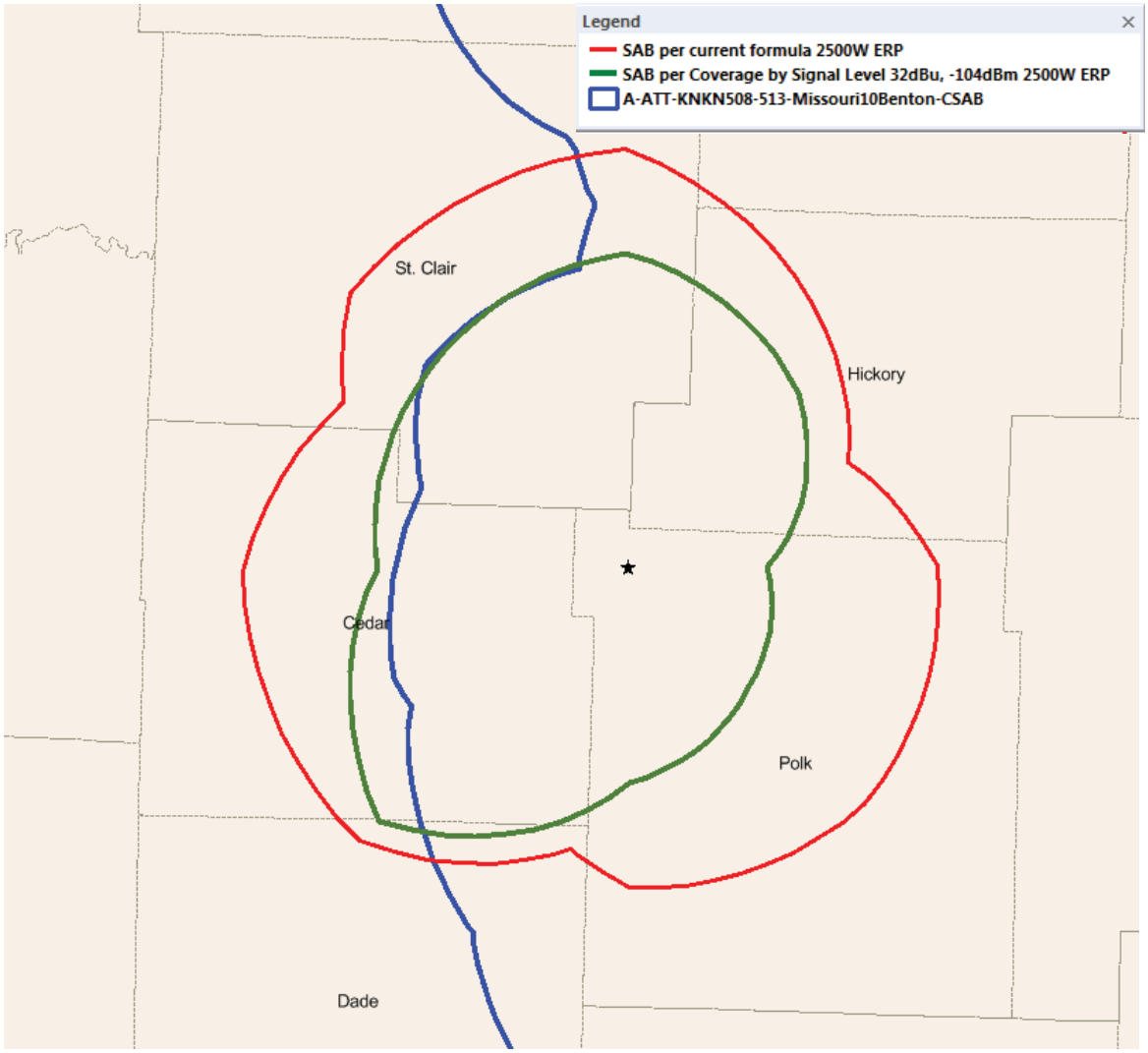

Figure 4

LTE 10 MHz Example